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agitation in the difficult genus Buteo, raised some years since by Dr. Bryant, is quieted by an unequivocal confirmation of the general tenor of that gentleman's views; *elegans*, *calurus*, *montanus*, *Bairdii*, *insignatus*, *oxypterus*, and *albonotatus* being all suppressed. Those that he gives as valid are, 1 (with four outer quills emarginate), *Cooperi*, *Harlani*, *borealis*, *lineatus*, *zonocercus;* and 2 (with three quills emarginate), *Swainsoni*, *fuliginosus*, *albifrons*, *Pensylvanicus.* Of these, *Harlani* and *Cooperi*, will bear further investigation; neither *fuliginosus* nor *albifrons* really occurs within our limits; so that the total number of our unquestionable species is only five. The northernmost *Asturina* (*A. plagiata*) is allowed; so is *Ictinia Mississippiensis.* *Falco polyagrus* Cass., is properly referred to *Mexicanus* Schl.; certain differences that we pointed out some time since proving dependent upon age. Our Aquila is not mentioned, apparently through an oversight.

The three new species are: 1. The Cuban and Haytian Tinnunculus, called *Falco leucophrys.* 2. The American analogue of the European Merlin, figured and described by Richardson and Swainson as *Falco æsalon*, and subsequently spoken of by Cassin, ourselves, and others under the same name. Mr. Ridgway finds it quite distinct from *æsalon*, as it certainly is from *columbarius*, and dedicates it to Dr. Richardson. 3. *Onychotes Gruberi*, n. g. et. sp., is said to be "utterly unlike any other American species. So much does it differ in structure, that we do not feel sure that it is not from some portion of the Old World, instead of from California" (p. 150), its reputed habitat.—E. C.

THE CLASSIFICATION OF THE EARED SEALS.—Having been kindly apprized by Mr. Allen that he would be obliged to answer my review of his esteemed work "On the Otariadæ," I awaited with interest the number of the NATURALIST containing it. A few words in justification of the review seem to be called for.

I cannot perceive that Mr. Allen has met the objections urged against the exclusive applicability and consequently the diagnostic value of the characters used in his diagnoses of the *Oulophocinæ* and *Trichophocinæ*, and after a careful perusal of Mr. Allen's comments, I cannot admit that the significance of the tables* and my remarks are at all diminished. I, therefore, again refer to them in justification of my criticisms, and have only to meet certain statements and objections urged against them.

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*The cause of the "rather obscure comparative tables" is due to the way the printer was obliged to express the "irregular" fractions (in the small type used) in connection with the whole numbers, and I may add to the same cause is due the unusual presentation of the dental formulæ.

I. *Trichophocinæ*, "without under fur;" *vs.* *Oulophocinæ*, "with under fur."

I must repeat my original remarks:—"We may at once concede the applicability of the distinctions based on the pelage, remarking, however, that the character is not as absolute as might be inferred from the expressions used." Mr. Allen has reluctantly admitted the existence in *Trichophocinæ* of sparse hairs homologous with the under fur of *Oulophocinæ*. Dr. Peters especially distinguished the Oulophocine *A. antarcticus* (*O. pusilla* Peters) by the very thin under fur. "Since Dr. Peters wrote, it has been [also] ascertained that" the "young, about eighteen inches long" has the "under fur brown, *very sparse*," and adults, apparently supposed by Mr. Allen to belong to the same species, "are so *nearly destitute of under fur*, except just on the crown of the head, that [Dr. Gray is] convinced they could not be dressed as fur-seals," and he believes "they are a most distinct species," which he calls *A. nivosus*.* Dr. Murie† has also shown that in *Otaria jubata*, there "is a reddish underwool, but very sparsely scattered." It may, therefore, be thought that I have conceded even too much value to the character in question.

II. "Size large and form robust," in *Trichophocinæ; vs.* "size smaller; form more slender," in *Oulophocinæ*.

A distinction appears thus to be plainly made between absolute length and comparative stoutness or slenderness. Mr. Allen, at least, has not attributed the appearance to tautology. Under the heads, then; first, of length; second, of stoutness, the objections of Mr. Allen must be met.

1. *Length.* As Mr. Allen remarks, "slenderness and robustness of form usually [but by no means always‡] involve the head as well as the trunk." Mr. Allen, then, at least, cannot object to the consideration of the length of the head as a fair meter and exponent of the total length of the animal.

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* Observations on the Fur-seals of the Antarctic seas and the Cape of Good Hope, with the description of a new species. By Dr. J. E. Gray. Ann. and Mag., Nat. Hist. 4th s., 1, 1868, p. 219.

† Report on the Eared Seals collected in the Falkland Islands. By James Murie. Proc. Zool. Soc., 1869, p. 105.

‡ See, for example, *Zalophus*.

The following examples will then suffice to prove "that the difference in size seems to be more than reduced to a minimum, and to be degraded to absolute nullity."

Callorhinus ursinus (*A* "*Oulophocin*") .275 millimetres.

Zalophus Gillespii (*A* "*Trichophocin*") .270 millimetres.

"The length of a full-grown male [of *C. ursinus*] is between seven (7) and eight (8) feet."* "The mounted skin of an adult male [*Z. Gillespii*] preserved in the Museum of the Pays-Bas [Schlegel] says, is '*six* (6) *pieds et deux* (2) *pouces en totale longueur.*'"† The skeleton of an unusally large specimen of *Z. Gillespii* measures less than seven (7) feet; its skull, 330 millimetres. Comment is unnecessary.

2. *Stoutness or slenderness.* Knowing the materials, specimens as well as literature, at the command of Mr. Allen, I was at a loss to know how he had obtained the data which enabled him to classify all the species into two groups, distinguished by comparative robustness or slenderness. I carefully examined his work, and finally noticed the *apparent* characters deducible from the skins, and recalling the case of some animals (especially the small weasels) in which the slenderness of the body is due to the elongation of the vertebræ, I inferred that such hints might have induced Mr. Allen to use such data. I was, indeed, surprised at such a standard, and intimated by the remark that "no data are given concerning the ratio of the girth to the length," what I considered to be a better criterion of robustness or slenderness.

Mr. Allen has, however, at length remarked that his "observation was based on a comparison of the skeletons of *two* of the leading genera—*Eumetopias* and *Callorhinus*—and the figures and descriptions of the other species." I must confess that I am more surprised at this than when I suspected that I had detected Mr. Allen's meter of slenderness in the relative elongation of the skins; in the one case, he had measurements of all the species, such as they were; in the other, he had only *two* species, out of the *eight* admitted (with reserve, however,) by himself, illustrations of the skeletons of two others, and figures foreshortened or from stuffed specimens of others. Now, if Mr. Allen can select from such data evidence in favor of his views, I can select that which will rebut them. Whether he is really right or wrong, however, I do not pretend to say. I merely say that the evidence is insufficient, and I only object to his taking for granted what may be a question in dispute.

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* On the Eared Seals (Otariadæ). By J. A. Allen. p. 76.

† Op. cit., p. 69.

III. "Ears short and broad," in *Trichophocinæ; vs.* "the ears much longer than in Trichophocinæ," in *Oulophocinæ.*

Thinking that no fairer meter of the length of the ears could be found than in their ratio to the head, I gave, after the measurement of the skulls, those of the ears.

Mr. Allen, in answer, remarks that I seem "to have forgotten that the bulk of *Eumetopias* is several times that of the largest of the fur seals. So that, while the ear is absolutely but little longer in the fur seals than in the longest-eared hair seals, it is relatively much longer."

I will only reply in the expressive language of Mr. Allen, that the idea of determining the slenderness of the ears — rudimentary structures, too — by their ratio to the "bulk" of the animal, "is, to say the least, a novel one to me."

Mr. Allen has declined to discuss the taxonomic value of these distinctions, *i. e.* to prove that they are of sub-family value. I shall not attempt to prove that they are not. Every well-informed therologist, from his own knowledge of the differences exhibited by otherwise homogeneous genera in the character of the pelage, the variation in size, and the comparative smallness of very small ears, the *only* characteristics still urged for the differentiation of the "sub-families," will decide for himself.

I felt constrained — my great respect for the abilities of Mr. Allen constrained me — to examine the basis of Mr. Allen's classification before dissenting from it and exposing my own views. The great respect which I entertained I endeavored to manifest in my review of his work; in the mode of presentation of objections, Mr. Allen has furnished abundant precedents.

As to my own views, I shall leave to others to decide whether they are more tenable than Mr Allen's or otherwise. I shall only add that after mentioning the combination of characters common to *Zalophus* (which Mr. Allen has apparently overlooked), I presented a dichotomous synopsis exhibiting the subordination of the groups, making special use of the form of the profile, whether decurved, or whether straight or incurved, and the development of the sagittal crest.

To both, Mr. Allen objects; "the comparatively unimportant character furnished by the rostral outline being far less characteristic than its slender elongated muzzle and other features," he says, and he deems the character of the rostral profile to be "too trivial to require more than the incidental remarks already given to it." How, may I ask, is the "slender elongated muzzle" produced if not by the "straight or incurved fronto-rostral profile," *i. e.* the compression of the maxillary and nasal bones, and what is "the slender elongated muzzle" but the expression of such structural characteristic? *

As to the "sagittal groove from which are reflected the low ridges" of most of the species as opposed to the "solid much elevated crest" of *Zalophus*, the characters, it must be remembered, are comparative and only to be considered with relation to each other (like the comparative diagnoses of Mr. Allen). Although backed by Mr. Allen,† I however admit that my language has not been happily selected and may mislead.

It need only be added, however, in the language of Mr. Allen, that "*Zalophus*, so far as the skull is concerned, is the most distinct generic form of the family Otariadæ, it being thoroughly distinct from all the others. Whether such distinct characters are more than counterbalanced by such as Mr. Allen has used for the differentiation of his subfamilies, may safely be left, without further argument on my part, to the judgment of others.

A word as to "conservatism." I used the term "extreme conservatism" because the reduction of species is popularly considered to be an evidence of conservatism. But Mr. Allen's "extreme conservatism" degenerates into radicalism in his attack on the current views with respect to the limits of the species. The *Otaria Hooperi*, for example, has characters sufficiently "tangible" to have deceived all authors who have examined specimens (among them some of the first of living naturalists), as to its affinities, and it has been separated generically from what (with Mr. Allen) I am disposed to consider its nearest ally and congener, and yet Mr. Allen (without having seen it) referred it to *Otaria jubata* as an individual variation. Mr. Allen may be right, but the evidence and weight of authority are decidedly against him.

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* Mr. Allen apparently having at first recognized this relation of cause and effect, in his diagnosis of *Zalophus* described "the superior profile from the postorbital process anteriorly, gently declined." Allen, op. cit., 48.

† "The sagittal crest (of Zalophus) forms a remarkably high, thin, very bony plate, unparalleled in its great development in any other genus of the family." — Allen op. cit. p. 48.

In conclusion, I would renew my testimony as to the great merit of Mr. Allen's work, and I only regret that I cannot entirely concur with him. Although Mr. Allen has not really met the objections urged against his views, it might not be obvious to all that he has not, and there might be those who would take for granted the proposition that I had "fallen into several by no means unimportant errors." I leave the decision on this charge to the scientific public. And as there seems to be some danger of the real questions at issue being obscured by side issues, I beg to restate them. They are: —

1st. Are the groups *Trichophocinæ* and *Oulophocinæ* entitled to the rank of subfamilies on account of the characters assigned?

2d. Is *Zalophus* a natural associate of *Otaria* and *Eumetopias* in a *homogeneous and natural* group to be *contrasted* with the *Oulophocinæ?*

Everything not bearing on these is irrelevant.

As may be perceived, the consideration of the question of the *values* of characters has been distinctly varied by Mr. Allen, and the discussion shifted to the question of the existence of some of the distinctive characters employed for the differentiation of the *Trichophocinæ* and *Oulophocinæ*. I will therefore repeat my original admission that the *Trichophocinæ* (*after the elimination of Zalophus*) and the *Oulophocinæ* are natural combinations, but not subfamilies, definable by the characters used by Mr. Allen. — THEODORE GILL.

THE GEOLOGY OF IOWA.* — These two elegant volumes are the "results of examinations and observations made within the years 1866, 1867, 1868, and 1869." The first volume contains in the first part an account of the physical geography and surface geology by Dr. White, with a chapter on the climate by T. S. Parvin.

The second part describes the general geology of the state, including the Azoic, Lower and Upper Silurian, Devonian, Carboniferous, and Cretaceous Systems, the chapter on the middle Coal Measures by O. H. St. John. The third part embraces the county and regional geology, which is completed in the second volume,

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* Report on the Geological Survey of the State of Iowa. By Charles A. White, M. D.; Orestes H. St. John, assistant; Rush Emery, chemist. 2 vols. 1870. Royal 8vo. Des Moines. With plates and maps.